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Maternal and Fetal Outcome in Trial of Labor after Cesarean

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I. INTRODUCTION

The risks, benefits, and relative safety of vaginal birth after cesarean (VBAC) have been a subject of interest for well over 100 years.1

Rate of cesarean section: Edward Cragin first coined the phrase "once a cesarean, always a cesarean" in 1916.1 Cesarean section is the most frequently performed surgical procedure in the United States. Nearly one in four deliveries has been performed abdominally since 1986.[2]This amounts to 24.7%.[3]. Cesarean delivery rates in the United States showed a dramatic rise during the period from 1965 to 1980. The institutional cesarean delivery rates were between 16.63% and 17.78% for the period from 1984 to 1988. By the early 1990s the National cesarean rate was 25% but fell to 21% in 1996.[4]While primary cesarean rates fell from 1989 to 1996, they steadily climbed since 1996, to a high of 16.9% in 2001.[5] The Centers for Disease Control and Prevention documented in 1999 that there had again been an increase in the cesarean rate, which was then 20.9%.[6]In 2007, cesarean births represented 31.8% of all births in the United States—an all-time high.

Although the United States has experienced a steeper increase over time, a similar pattern was seen in many European countries. This worldwide increase has caused great concern.[7] Similar trend was also seen in low resource countries like China, Brazil and India, especially due to births in private hospitals.[8]

Aimed rate: No specific rate has been aimed for, but it was thought that a 10% cesarean delivery rate is possible.4 The new goal for 2020 has been set at 23.9%.1

Reasons for increase in caesarean rate:

- Uterine rupture: Concerns about this complication have led to a significant decline in attempted VBAC in nearly all countries, with a simultaneous increase of cesarean rates.
- maternal request: Of all cesareans 4-18% were performed on maternal request.7, from 30% to 50% choose to undergo a repeat cesarean delivery. Women's preferences and expectations regarding the delivery method are based not only on the assessment of medical risks but are also influenced by personal and attitudinal factors. The most frequent reasons reported for choosing elective repeat cesarean section were the fear of failed trial of labor, concerns about the dangers of vaginal birth, the fear of pain, a desire for sterilization, and the convenience of scheduling.9

risks of multiple repeat cesarean deliveries

- surgical procedures become increasingly complicated with an increasing number of prior abdominal surgeries.
- abnormal placentation (previa, accreta) increases as the number of prior cesarean deliveries increase.10
- There is mounting evidence that cesarean delivery is associated with not only short-term health consequences such as bleeding, infection, impaired breast-feeding, and infant bonding, but perhaps more important, adverse reproductive outcomes in subsequent pregnancies such as ectopic pregnancy, abnormal placentation and hysterectomy.11
- Cesarean delivery implies a higher risk of maternal death, a longer recovery time and operative complications, a higher risk of unexplained stillbirths in subsequent pregnancies, and respiratory problems of the newborn infant.12

- Also cesarean section delivery is an independent risk factor for stroke World 4 Health Organization has warned that, as a direct result of cesarean section (CS) deliveries, the risk of postpartum death can be up to 3.6 times higher than that for conventional vaginal deliveries.13 Serious maternal morbidities progressively increase as the number of previous cesarean deliveries increase.14 The appropriateness of the rising rate of cesarean delivery worldwide has been debated

Attempted vaginal delivery for women with a single previous low transverse caesarean section is associated with a reduced risk of complications for both mother and baby than elective repeat caesarean section is. Absolute risk of maternal and perinatal morbidity is low during a TOL after prior cesarean delivery.[15]**TOL success rate** has been reported up to 60% to 80%.[12] Encouraging selective trial of labor (TOL) or vaginal birth after cesarean (VBAC) has been considered a key method of reducing the cesarean rate.[6,16,18]

Trial of Labor versus Repeat Cesarean Delivery: Contemporary literature supports the view that < 1% of women undergoing a trial of labor will sustain a uterine rupture and that when prompt intervention is available reasonably good results can be anticipated.19

This study is undertaken as an attempt to re-emphasize on the safety of TOLAC so as to decrease the rate of repeat cesarean section in women with previous one low transverse cesarean section.

II. OBJECTIVES

General Objective:

To assess the maternal and fetal outcome in trial of labor after cesarean as compared to elective repeat cesarean section.

Specific Objectives:

1. To compare the maternal outcome in terms of uterine rupture/ dehiscence, hysterectomy, postpartum hemorrhage, requirement of blood transfusion, duration of hospital stay and mortality in patients with previous one lower segment cesarean section undergoing trial of labor verses those undergoing elective repeat cesarean section.
2. To compare the neonatal outcome in terms of 5 minute apgar score, admission to NICU and mortality in patients undergoing trial of labor after cesarean verses those undergoing elective repeat cesarean section.

III. MATERIALS AND METHODS

TYPE OF STUDY: It is a prospective comparative study of outcome of patients with previous one caesarean section subjected to trial of labor verses those undergoing Elective repeat cesarean section.

DURATION OF STUDY: August 2012 to July 2013.

CRITERIA FOR SELECTION: All women with previous one low transverse caesarean section who delivered after 20 weeks of gestation, with a singleton pregnancy.

232 cases of previous cesarean section presented to the Department of Obstetrics, OPD and labor room during the period of study.

Inclusion criteria: All patients with previous one lower segment cesarean section with no associated Medical or Obstetrical complications with singleton pregnancy at term, who had no contraindication to vaginal delivery.

Exclusion criteria: 181 patients were excluded from the study based on the following criteria.

- Cases with previous two or more cesareans.
- H/o myomectomy or additional abdominal surgeries.
- Patients with documented or suspected previous classical scar on uterus.
- Associated medical / obstetrical complications.
- Multifetal gestation.
- Patients who did not agree to be a part of the study.
- Known mullerian abnormalities.
- Prior H/O uterine rupture.
- Maternal obesity.
- Interdelivery interval < 2years.

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IV. OBSERVATIONS AND RESULT

TABLE 1: DISTRIBUTION OF STUDY GROUP ACCORDING TO AGE GROUP

TABLE 1 A

Age group	TOLAC	ERCS	P value

(yrs)	n =81	%	n =70	%	0.05
18-25	27	33.33	19	27.14	
26-30	43	53.09	42	60	
31-35	5	6.17	9	12.85	
>35	6	7.41	0	0	
Mean ±SD	27.59±3.82		27.31±2.54		

There is no significant difference in the age distribution between the two groups (p=0.05).

TABLE 1 B:

Age group	S-TOL		F-TOL		P value
(yrs)	n= 60	%	n =21	%	0.68
18-25	18	30	9	42.86	
26-30	34	56.67	9	42.86	
31-35	4	6.67	1	4.76	
>35	4	6.67	2	9.52	
Mean ±SD	27.7±3.7		27.3± 4.3		

The age distribution is not different in S-TOL and F-TOL (p=0.68).

TABLE 2:DISTRIBUTION ACCORDING TO SOCIO ECONOMIC STATUS

S.E. Status	TOLAC		ERCS		Total n =151	p value
	n =81	%	n =70	%		
Lower	44	80	11	20	55	<0.001
Middle	37	44	47	56	84	
Upper	0	0	12	100	12	

There is statistically significant difference in the socioeconomic status difference between the two groups (p <0.001). 80% of pts of lower SE status choose TOLAC whereas 44.04% of patients of Middle SE status choose TOLAC (p value is < 0.001). No patients from Upper SE status opted for TOLAC.

TABLE 3:GESTATION AGE AT DELIVERY

GESTATION AGE(weeks)	S-TOL	%	F-TOL	%	TOLAC	%	ERCS	%	p value
37-39	36	60	10	47.62	46	56.79	30	42.86	0.211*
39-41	24	40	10	47.62	34	41.98	40	57.14	
≥41	0	0	1	4.76	1	1.23	0	0	

*compared for Elective and TOLAC

The difference in Gestation age between Elective and TOLAC groups is not statistically significant (p=0.211).

TABLE 4:PARITY DISTRIBUTION

Parity	S-TOL n = 60	%	F-TOL n =21	%	p value
1	35	58.33	18	85.71	0.06
2	16	26.67	1	4.76	
3 or more	9	15	2	9.5	

TABLE 5: H/O PREVIOUS VAGINAL DELIVERY

PREVIOUSVAGINAL DELIVERY	S-TOL	F-TOL	P value
PRESENT	25	3	0.023
NOT –PRESENT	35	18	

Out of 81 cases subjected to TOLAC, 28 (34.57%) had an H/O prior vaginal delivery. Of all patients with S-TOL, H/O of prior vaginal delivery is present in 25 cases, whereas in cases of F-TOL, H/O vaginal delivery is present in 3 cases. This difference is statistically significant (p=0.023).

TABLE 6:INDICATION OF PREVIOUS CESAREAN AND DELIVERY OUTCOME

Indication of previous CS	Delivery outcome			TOTAL n =151
	Elective Repeat CS (n=70)	TOLAC (n=81)		
		S-TOL (n=60)	F-TOL (n=21)	
NPOL	16	5	12	33
CPD	11	7	2	20
FD	15	22	2	39
MP	15	16	2	33
APH	2	2	1	5
BOH	2	0	0	2
POSTTERM	1	1	0	2
PE/Eclampsia	5	5	1	11
Unknown	3	2	1	6

It is observed that Fetal distress (25.83%), Non progress of labor (21.85%) and, Malpresentation & Malpositions (21.85%) account for indications of previous CS in 69.5 % cases.

INDICATION OF PREVIOUS CESAREAN AND DELIVERY PARAMETERS

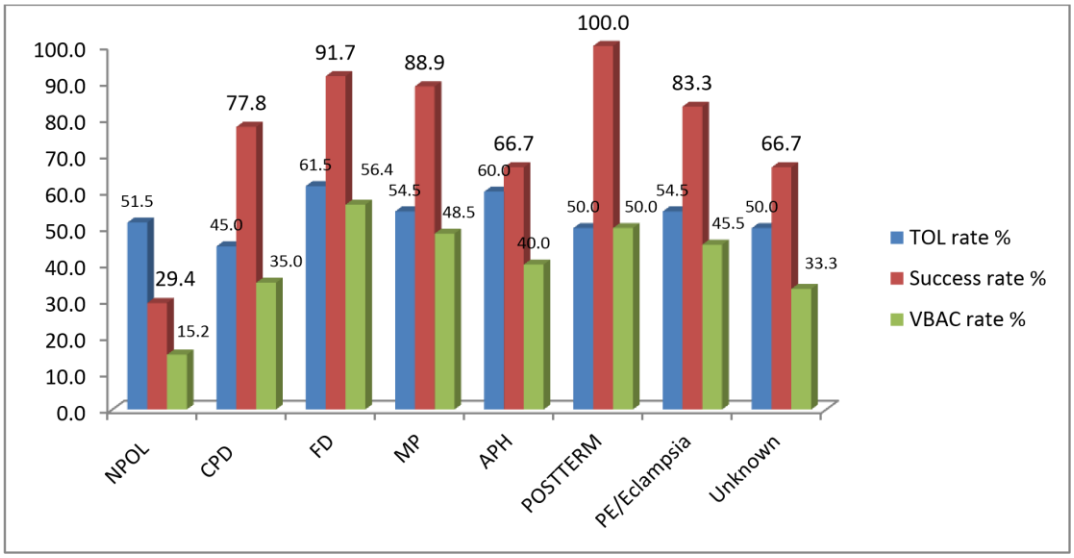

Figure 3. showing effect of indication of previous cesarean on TOL rate, success rate and VBAC rate.
TOL rate is defined as the percentage of patients with a previous Cs who underwent a TOL. Success rate is defined as the percentage of the patients who deliver vaginally. VBAC rate is defined as the percentage of patients with a previous CS who deliver vaginally and is calculated as the TOL rate multiplied by success rate of TOL.

TOL rate is highest in cases where previous CS is done for fetal distress. Also success rate in this group is 91.7% and VBAC rate is 56.4%. Only one case had previous indication of post- term pregnancy and had successful trial of labor in the present pregnancy.

The success rate of TOLAC is minimum (29.4%) for cases where previous CS is done for NPOL.

TABLE 7: CORRELATION OF BISHOP SCORE TO SUCCESSFUL OUTCOME

BISHOP SCORE	S-TOL		F-TOL		p value
	No.	%	No.	%	
0 – 5	1	1.67	4	19.05	<0.001
6 – 7	12	20	10	47.62	
8 – 13	47	78.33	7	33.33	
Total	60	100	21	100	
Mean±SD	9.58 ± 2.29		7.29 ± 2.305		

Out of 60 cases of S-TOL, Bishop Score is ≥ 8 in 47 (78.33%) cases ($p < 0.001$) which is statistically significant.

DISTRIBUTION OF CASES ON THE BASIS OF AUGMENTATION OF LABOR

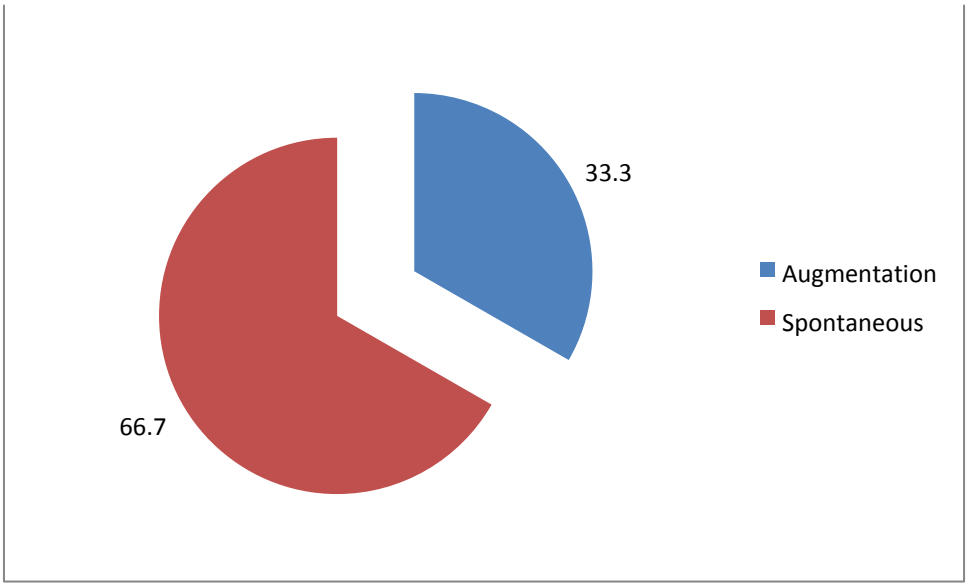

Figure 4: Showing percentages of spontaneous and augmented labors in the study

TABLE 8: MATERNAL COMPLICATIONS

Complication	TOLAC (n=81)		S-TOL (n=60)		F-TOL (n=21)		ERCS (n=70)		P*	P**	P***	P****
	n	%	n	%	n	%	n	%				
Scar dehiscence	8	9.88	0	0	8	9.88	0	0	0.019	<0.001		<0.001
PPH	10	12.34	5	8.33	5	23.80	8	11.43	1	0.142	0.558	0.286
Blood Transfusion	12	14.81	5	8.33	7	33.33	6	8.57	0.238	0.016	1	0.013
Wound infection	3	3.70	0	0	3	14.29	1	1.43	0.719	0.021	1	0.056
DHS>6Days	14	17.28	0	0	14	66.67	3	4.29	0.012	<0.001	0.30	<0.001

*****compared for Elective and TOLAC
******compared for STOL and FTOL
*******compared for STOL and Elective
********compared for FTOL and Elective

In the TOLAC group, the incidence of **scar dehiscence** is 9.88% whereas no scar dehiscence occurred in the ERCS group. This difference is statistically significant (p =0.019).

There is no case of scar dehiscence in the S-TOL group whereas it is 9.88% in the F-TOL group (p <0.001).
The incidence of scar dehiscence is significantly more in the F-TOL category as compared to ERCS category (p <0.001).
PPH occurred more commonly in the TOLAC group (12.34 %) as compared to ERCS group (11.43 %) (p = 1).The incidence of PPH in S-TOL as compared to F-TOL is 8.33% and 23.80% respectively (p=0.142). PPH occurred more frequently in ERCS (11.43%) as compared to S-TOL (8.33%) (p =0.558). However, these differences were not statistically significant

Blood transfusion requirement is more in TOLAC (14.81%) as compared to ERCS (8.57%).
The difference is not statistically significant (p=0.238). The blood transfusion requirement in F-TOL (33.33%) as compared to S-TOL (8.33%) is significantly more (p =0.016). There is no significant difference in the blood transfusion requirement in the S-TOL (8.33%) as compared to ERCS (8.57%) (p =1). However, the blood transfusion requirement is significantly more in the F-TOL group (33.33%) as compared to those who chose ERCS (8.57%) (p =0.013).

Wound infection is more in the TOLAC group (3.70%) as compared to ERCS (1.43 %). The difference however is not statistically significant (p =0.719). All wound infections occurred in cases of failed trial of labor who underwent an emergency cesarean section. Those undergoing emergency cesarean had a wound infection rate of 14.29% whereas it is 1.43% for those who chose repeat cesarean section. The difference however is not statistically significant (p =0.056).

D**uration of hospital stay of more than 6 days** is significantly greater in the TOLAC category (17.28%) as compared to ERCS category (4.29%) (p= 0.012).
66.67% cases of F-TOL had DHS > 6 days whereas it is in 4.29% cases in ERCS (p<0.001).

TABLE 9:INDICATION OF REPEAT C.S. IN F-TOL AND IT'S ASSOCIATION WITH UTERINE RUPTURE/ DEHISCENCE:

Indication	Number	Scar dehiscence	%	P
NPOL	10	4	40	0.288
Fetal distress	4	3	75	
Scar tenderness	5	1	20	
CPD	2	0		

The association between indication of repeat CS in F-TOL and uterine lesions is not statistically significant (p=0.288)

TABLE 10: NEONATAL COMPLICATIONS

Parameter	TOLAC		S-TOL		F-TOL		ERCS		P*	P**	P***	P****
	(n)	%	(n)	%	(n)	%	(n)	%				
Birth Weight (mean ±SD)	2.88±0.38		2.88±0.34		2.99±0.39		2.85±0.27		0.346	0.223	0.702	0.084
5 min APGAR score <7	5	6.25	1	1.7	4	19.05	1	14.28	0.278	0.022	1	0.010
Admission to NICU	4	4.93	1	1.7	3	14.29	1	14.28	0.169	0.087	0.938	0.012

*****compared for Elective and TOLAC
******compared for STOL and FTOL
*******compared for STOL and Elective
********compared for FTOL and Elective

In the TOLAC and ERCS groups there is no statistically significant difference in the incidence of 5 minute Apgar score <7 (6.25% vs 14.28%) (p =0.278) and NICU admission (4.93 vs 14.28%) (p =0.169)
In cases of F-TOL the 5 minute apgar score <7 is present in significantly more neonates (19.05%) as compared to in 1.7% of neonates in the S-TOL category (p =0.022).
The difference between STOL and Elective in the incidence of 5 minute apgar score <7 (1.7% vs 14.28%) is not statistically significant (p =1). Also there is no significant difference in the NICU admission rate (1.7% vs14.29%) (p=0.938)/.

The difference between FTOL and Elective in the incidence of 5 minute Apgar score<7 (p=0.01) and Admission to NICU (p=0.012) is statistically significant.

V. Discussion

This prospective study compared the maternal and neonatal morbidity and mortality in cases of previous one lower segment cesarean section subjected to trial of labor verses those undergoing elective repeat cesarean section. During the period of study from August 2012 to July 2013, 2314 patients were admitted to the labor room. There were 1485 (64.17%) vaginal deliveries and 829 (35.83%) cesarean sections. There were 232 cases of previous cesarean section of which 151 were eligible candidates for vaginal delivery. As 70 (46.35%) eligible patients refused to undergo TOLAC and underwent elective repeat cesarean section (ERCS) trial of labor attempt rate was 53.64%.Successful vaginal delivery occurred in 60 cases (74.07%) whereas 21 (25.93%) cases in the TOLAC category required an emergency CS. The maternal morbidity was compared in terms of uterine rupture/dehiscence, PPH, requirement of blood transfusion, wound infection and duration of hospital stay.

Although there was no scar rupture, scar dehiscence was observed in 8 (9.88%) cases subjected to TOLAC. All scar dehiscences were observed in the F-TOL category. There were no cases of scar dehiscence in the S-TOL and ERCS group. PPHoccurred more commonly in the TOLAC group (12.34 %) as compared to ERCS group (11.43 %), it was least those who had S-TOL (8.33%). Blood transfusion requirement in TOLAC, ERCS, S-TOL and F-TOL was 14.81%, 8.57%, 8.33% and 33.33% respectively. As compared to ERCS wound infections in cases of failed trial of labor who underwent an emergency cesarean section was increased (1.43 % vs 14.29%). Duration of hospital stay of more than 6 days was maximum in cases of F-TOL (66.67%).

VI. Conclusion

The study concludes that trial of labor after cesarean is a safe option in women who have had a previous single low transverse cesarean section with no contraindication to vaginal delivery provided the hospital has availability of well trained staff, monitoring facilities, adequate blood bank services and facilities for emergency cesarean section. Maternal morbidity is lower in cases of S-TOL as compared to ERCS. However, the cases which attempt and fail TOLAC have significantly increased morbidity in the form of scar dehiscence, increased need for blood transfusion, increased incidence of abdominal wound infection and greater duration of hospital stay.

VII. Recommendation

The rising rate of cesarean section definitely has major implications. Not only the increasing cesarean rate puts greater financial burden on the health care system but also repeated cesarean deliveries increase maternal morbidity and even mortality. All patients with previous one lower segment transverse cesarean section with no other contraindication to vaginal delivery should be offered trial of labor and those with a history of previous vaginal delivery should be encouraged for trial of labor.

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